

## A New Stichaeid Fish, *Dictyosoma rubrimaculata* from Japan, with Notes on the Geographic Dimorphism in *Dictyosoma burgeri*

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**Abstract** The Stichaeid genus *Dictyosoma* has so far been regarded as represented by a single species, *D. burgeri*. Critical examination of specimens referred to *Dictyosoma* revealed that this genus includes two species. *D. rubrimaculata* is described as new. This species is distinguished from its congener, *D. burgeri*, by the lateral line structure, counts for dorsal and anal fin rays and vertebrae and coloration. It was also detected that there are two geographic forms in *D. burgeri*. *D. rubrimaculata* occurs along the Japanese coasts of the Pacific and the Sea of Japan, and is sympatric in its range with both of the two forms of *D. burgeri*. In the Pacific coast the two species show more or less clear isolation in their habitat preference; *D. rubrimaculata* inhabits rocky and weedy shores, while *D. burgeri* commonly inhabits poorly vegetated, sandy to rocky intertidal zones. Ecological isolation is not yet investigated in the Sea of Japan. Morphological and ecological observations suggest that *D. rubrimaculata* is more primitive than *D. burgeri*.

*Dictyosoma burgeri* Van der Hoeven, (Stichaeidae, Xiphisterinae) occurs along the coasts of Japan, China, and Korea. Although this species has been regarded as the only representative of the genus *Dictyosoma* (Matsubara, 1955; Makuseok, 1958), variations to a great extent in its meristic characters (Makushok, 1958; Shiogaki and Dotsu, 1972) have posed problems in the specificity and delimitation of *D. burgeri*.

In this study, examination of extensive materials revealed that the genus contains two species, and that *D. burgeri* consists of two distinct geographic forms. *D. rubrimaculata* is proposed as new, and *D. burgeri* is redescribed with special reference to geographic variation.

### Methods and materials

Measuring and counting procedures followed Hubbs and Lagler (1948) except as noted below. The body depth was measured at the anus. The length of the last dorsal spine is the distance from the point of articulation with the proximal pterygiophore to the tip of the spine. Counts for vertebrae and unpaired

fin rays were taken from radiographs. Observations of the pelvic fin and pelvic girdle were made on cleared and stained specimens. The terminology of the cephalic sensory canals followed in general Makushok (1958).

The materials examined in this study are listed preceeding the description of each species. In the lists of materials, data for the specimens other than the holotype of *D. rubrimaculata* are given in the following order: catalogue number, number of individuals, standard length, collecting date. Abbreviations for the catalogue numbers of the specimens are: FSKU, School of Fishery Science, Kitasato University; HUMZ, Laboratory of Marine zoology, Faculty of Fisheries, Hokkaido University; MTUF, Museum, Tokyo University of Fisheries; NTMT-P, Department of Zoology, National Science Museum, Tokyo; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; YCM, Yokosuka City Museum.

### Genus *Dictyosoma*

*Dictyosoma* Schlegel (in Temminck and Schlegel), 1846:136, pl. LXIII, Fig. 3. Type



Fig. 1. *Dictyosoma rubrimaculata*, sp. nov. a) holotype, NSMT-P 18401, 122.2 mm SL, 131.2 mm TL, collected from Kominato, Chiba Pref.; b) radiograph of the same specimen.

species: *Dictyosoma burgeri* Van der Hoeven, by subsequent designation.

***Dictyosoma rubrimaculata* sp. nov.**

New Japanese name; Benitsukeginpo  
(Figs. 1, 2, 3a and 4)

*Dictyosoma burgeri*; Makushok, 1958: 104 (in part).

*Dictyosoma burgeri*; Shiogaki and Dotsu, 1972: 22 (in part); Arai and Shiotsuki, 1974: 363 (in part).

Holotype: NSMT-P 18401, 122.2 mm in standard length, 131.2 mm in total length, sex unidentified, collected from Kominato, Chiba Pref., Japan, on Mar. 5, 1977.

Paratypes: The following 58 specimens from Japan were designated as paratypes. From Kominato, Chiba Pref.: MTUF 22531 and 22532, 2, 23.5 and 24.1 mm, Mar., 1977; MTUF 22519, 2, 25.2 and 26.5 mm, 1955; MTUF 22516 (one cleared and stained), 9, 68.5~108.5 mm, 1955; MTUF 22488, 1, 127.0 mm, Jun. 18, 1974; MTUF 22489, 1, 117.0 mm, Feb. 27, 1976; MTUF 22530 and 22485, 2, 27.5 and 104.7 mm, May 9, 1977; NSMT-P 18402 and 18403, 2, 124.0 and 128.3 mm, May 29, 1977; MTUF 22596, 1, 114.5 mm, Jun. 13, 1977; MTUF 22487, 1, 119.5 mm, Jun. 15, 1977. From Yokosuka, Kanagawa Pref.: MTUF 23967~23079 (MTUF 23079 includes four specimens, each of other lots

one specimen), 16, 66.5~139.5 mm, Aug. 12, 1977; YCM 3251~2~3, 2, 98.5 and 128.5 mm, 1974; YCM 3378, 2, 124.0 and 126.0 mm, 1974. From Miura, Kanagawa Pref.: NTUF 22911 and 22910, 2, 132.7 and 141.0 mm, Jul. 23, 1977. From Manazuru, Kanagawa Pref.: MTUF 22761 (cleared and stained), 22814 and 22484, 3, 84.5~115.0 mm, May 8, 1977. From Izu-Oshima Is., Tokyo: MTUF 22490, 1, 109.0 mm, Aug. 17, 1974. From Nomozaki, Nagasaki Pref.: MTUF 22955, 1, 42.4 mm; MTUF 23116, 6, 63.0~124.4 mm; MTUF 22914, 1, 90.0 mm; collecting date for these three lots unknown. From Sado Is., Niigata Pref.: MTUF 22686, 1, 128.9 mm, May, 12, 1977. From Oga, Akita Pref.: MTUF 22491, 1, 118.0 mm, collecting date unknown. From Kurogashira, Iwate Pref.: FSKU 750812, 1, 105.7 mm, Aug. 12, 1975.

**Diagnosis**

Dorsal rays mostly 58~60 in total number; anal rays usually II, 36~39; vertebrae 19~21+41~46=61~66. Dorsal spines thick and short. Dorsal and anal fins completely confluent with caudal fin. Pelvic fins always present. Laterall line system forming a network on ventral surface of body both before and behind origin of anal fin. A red marking above pectoral fin.

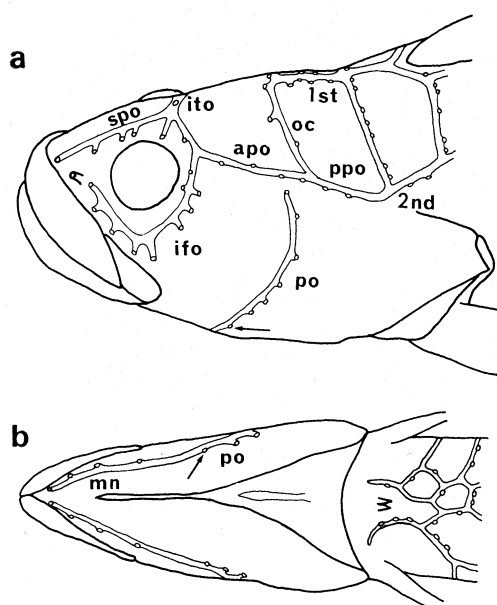


Fig. 2. Cephalic sensory canals of *P. rubrimacula*, MTUF 22761. a) lateral view; b) ventral view. apo, anterior postorbital canal; ifo, infraorbital canal; ito, interorbital pore; mn, mandibular canal; oc, occipital canal; po, preopercular canal; ppo, posterior postorbital canal; 1st, first longitudinal lateral line; 2nd, second longitudinal lateral line. Arrows indicate the same pore.

### Description

In the following counts and measurements, those of the holotype are given first, followed by those of paratypes in brackets. Mean values of paratypes are shown in parentheses.

D. LIII, 6 [III~LV, (51.7), 6~10, (7.6)]; 57~62, (59.3) in total number; A. II, 38 [II, 36~40, (37.8)]; P<sub>1</sub>. 11 [9~13, (11.4)]; P<sub>2</sub>. I [I]; C. 7+7 [7+7]; vertebrae 19+44=63 [19~21+41~46=61~66, (19.6+43.8=63.4)]. Measurements expressed in hundredths of standard length: body depth 13.7 [12.2~16.2, (13.7)]; head length 16.6 [14.8~19.0, (16.7)]; preanal length 44.4 [41.5~49.0, (44.3)]; length of dorsal fin base 85.5 [79.4~90.9, (85.3)]; length of anal fin base 52.1 [49.0~56.2, (53.5)]. Measurements expressed in hundredths of head length: eye diameter 17.7 [17.7~26.1, (18.5)]; upper jaw length 36.5 [32.8~46.1, (37.6)]; interorbital width 9.9

[9.4~14.1, (11.2)]; pectoral fin length 36.0 [27.8~39.8, (34.4)]; length of last dorsal spine 19.7 [20.5~33.0, (25.6)]. Pelvic girdle and dorsal spines thick.

Cephalic sensory canals and pores well developed (Fig. 2). Formation of canal system constant. Number and position of pores: supraorbital canal (spo), six or less on lower side and one (ito) at supraorbital commissure; infraorbital canal (ifo), usually nine on outer side and sometimes one or two pores on inner side posteriorly; preopercular canal (po), seven on outer side; mandibular canal (mn), four on outer side; anterior and posterior postorbital canal (apo, ppo) and occipital canal (oc), variable excepting two pores at center of supra-temporal commissure.

Lateral line system forming a complicated network: a first longitudinal lateral line originating from head as a continuation of occipital sensory canal, running along mid-dorsal line to origin of dorsal fin, and then branching off into two lines each extending on side immediately below base of dorsal fin until terminating at base of caudal fin; a second longitudinal lateral line originating from head as a continuation of postorbital sensory canal, running along side below first longitudinal lateral line and united with it near base of caudal fin; a third longitudinal lateral line extending along lower side of body from insertion of pelvic fin nearly to base of caudal fin and connected with fourth lateral line; a fourth longitudinal lateral line running on mid-ventral line from insertion of pelvic fin to anus, and then branching off into two lines each extending immediately above base of anal fin to base of caudal fin; these four longitudinal lateral lines connected with each other by numerous transverse branches, thus lateral line system forming a reticulate pattern on whole surface of body (Fig. 3a).

Scales cycloid. Body and base of unpaired fins covered with small scales. Head naked. Dorsal and anal fins completely confluent with caudal fin in adult, while incompletely in juvenile. An olfactory tube anteroventrally to eye. Posterior tip of maxillary reaching pupil but not posterior margin of eye. Branchial membranes meeting each other and free from

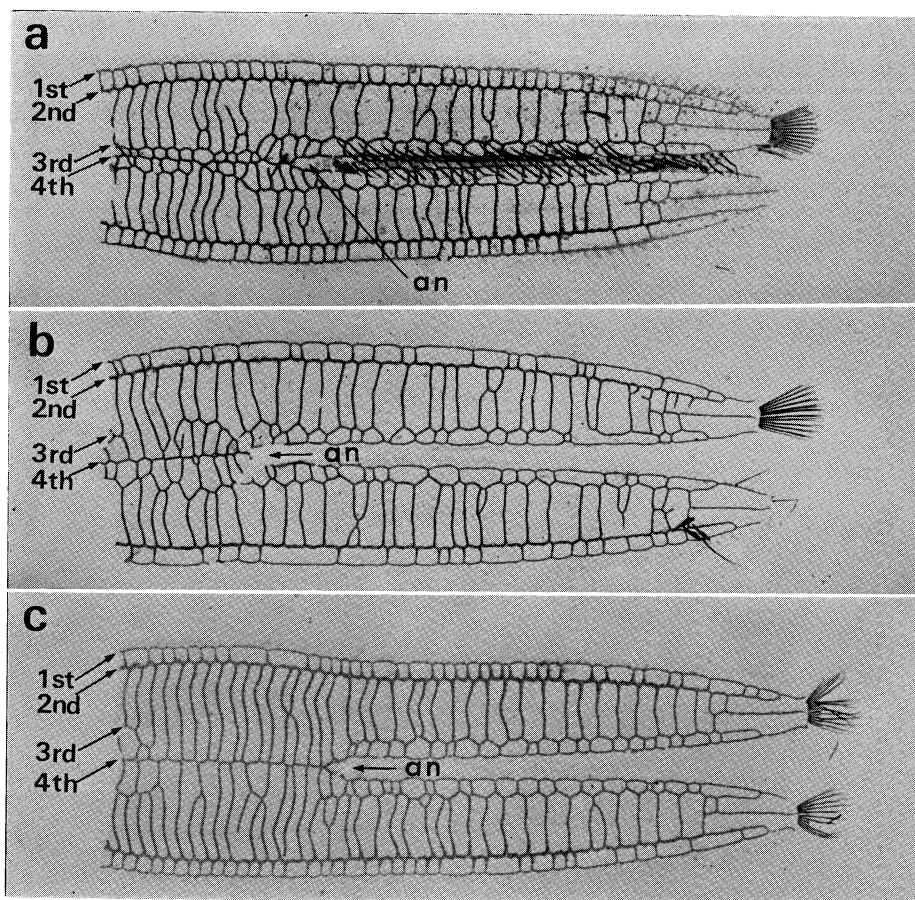


Fig. 3. Alizarin-stained transparent specimens of *Dictyosoma* showing the difference in lateral line structure. a) *D. rubrimaculata*, MTUF 22761; b) *D. burgeri* form a, MTUF 23120; c) *D. burgeri* form b, MTUF 23119. 1st~4th, first~fourth longitudinal lateral lines; an, anus.

isthmus. No dermal ridge in interorbital region.

Color in life: Body yellowish brown or orange, often with small black spots. Two large black blotches on each side of body above pectoral fin (Fig. 4). Interspace between the two blotches red. Juvenile and young with a broad white line along mid-dorsal line from tip of snout to origin of dorsal fin. Earlier juvenile whitish, with several radial black lines around eye.

**Distribution.** Specimens which we have identified as *D. rubrimaculata* are from the following localities: Kuragashira, Iwate Pref.; Kominato, Chiba Pref.; Yokosuka, Miura, and Manazuru, Kanagawa Pref.; Izu-Oshima Is., Tokyo; Oga, Akita Pref.; Sado Is., Niigata Pref.; Nomozaki, Nagasaki Pref. (Fig. 5). Further extensive investigations are

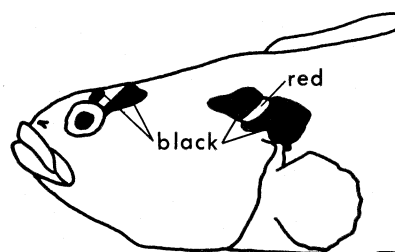


Fig. 4. Semidiagrammatic drawing to show the characteristic head markings of *D. rubrimaculata*.

required to determine the exact range of this species.

**Etymology.** The Latin name *rubrimaculata*, meaning red-spotted, refers to the characteristic red making above the pectoral fin.

**Remarks.** We have examined two of the

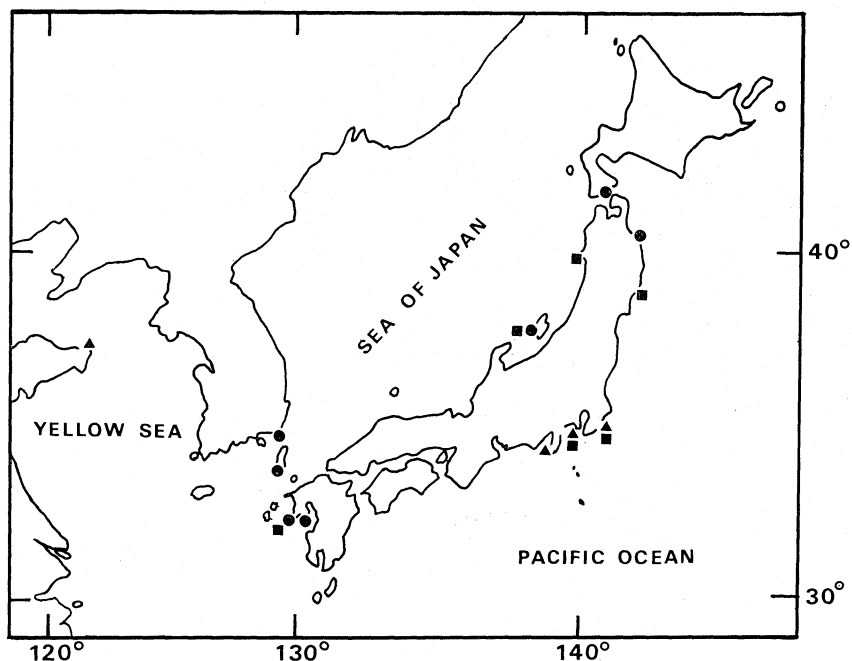


Fig. 5. Collecting localities of *D. rubrimaculata* (■), *D. burgeri* form a (▲), and form b (●). In the case of the Pacific coasts of middle Honshu, one symbol represents multiple collections from several locations in close proximity.

five syntypes of *D. burgeri* (RMNH 1948), and found that the two do not represent *D. rubrimaculata*. We also checked the descriptions of these syntypes by Schlegel in Temminck and Schlegel (1845), Van der Hoeven (1851), and Boeseman (1947). In these descriptions, no character indicative of *D. rubrimaculata* was recognized either.

*Dictyosoma burgeri* Van der Hoeven  
(Figs. 3b, c and 6)

*Dictyosoma burgeri* Van der Hoeven, 1851: 347; Jordan and Snyder, 1902: 279; Chang et al., 1955: 165; Arai and Abe, 1970: 92; Shiogaki and Dotsu, 1972: 22 (in part); Arai and Shiotsuki, 1974: 262 (in part).

*Dictyosoma temmincki* Bleeker, 1853: 42; Günther, 1861: 279, 564.

*Dictyosoma burgeri*; Bleeker, 1854: 9; Boeseman, 1947: 120; Makushok, 1958: 104 (in part); Makushok, 1961: 231.

**Materials examined.** From Tsushima Is., Nagasaki Pref.: NSMT-P 8841~8851 (8843 cleared and stained), 11, 39.8~192.5 mm, Aug., 1969; NSMT-P 6300 and 6301, 2, 93.5

and 180.0 mm, Jul. 13, 1968; NSMT-P 6295~6297, 3, 125.8~156.0 mm, Jul. 11, 1968; NSMT-P 6302, 1, 163.5 mm, Jul. 20, 1968; NSMT-P 6294 and 6293, 2, 172.0 and 221.0 mm, Jul. 9, 1968. From Sado Is., Niigata Pref.: MTUF 22687~22689, 3, 147.5~175.5 mm, May 12, 1977; MTUF 22691 and 22690, 2, 194.4 and 204.7 mm, May 16, 1977. From Hakodate, Hokkaido: HUMZ 41613~41617 and 41619~41623, 10, 122.3~260.0 mm, May 12, 1960; HUMZ 64359, 1, 260.0 mm, Jun., 1973. From Taneichi, Iwate Pref.: NSMT-P 6436, 1, 208.5 mm, Jun. 6, 1967. From Nomozaki, Nagasaki Pref.: MTUF 23117, 13, 61.3~94.4 mm; MTUF 23118, 22, 83.6~231.0 mm; MTUF 23119 (cleared and stained), 2, 61.0 and 84.3; collecting date for the above three lots unknown; MTUF 22915, 5, 32.1~79.3 mm, Jul. 9, 1971. From Shimabara, Nagasaki Pref.: RMNH 1948, syntypes of *D. burgeri*, 2, 122.0 and 195.5 mm, 1829. From Kominato, Chiba Pref.: MTUF 22520, 5, 27.4~35.1 mm, Apr. 18, 1977; MTUF 22521, 1, 34.4 mm, Apr. 27, 1974; MTUF 22590~22592, 3, 51.0~58.4 mm, May 31, 1977; MTUF 22586~22589, 4, 51.6~55.0 mm, May 30, 1977; MTUF 22504

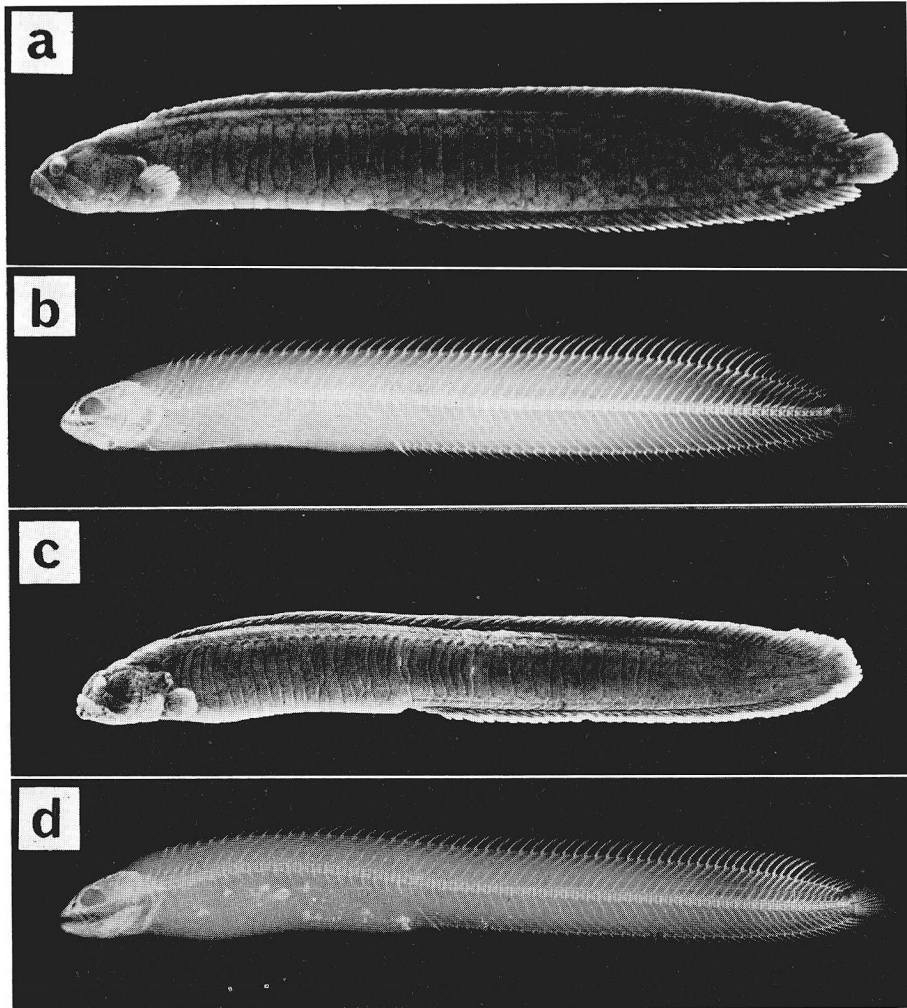


Fig. 6. *Dictyosoma burgeri*. a) form a, MTUF 22577, 124.5 mm SL, 134.4 mm TL, collected from Kominato, Chiba Pref.; b) radiograph of the same specimen; c) form b, MTUF 22689, 169.0 mm SL, 180.0 mm TL, collected from Sado Is., Niigata Pref.; d) radiograph of the same specimen.

and 22505, 2, 57.0 and 74.3 mm, Sep. 8, 1976; MTUF 23120 (cleared and stained), 2, 67.0 and 73.8, Sep. 8, 1976; MTUF 22506~22515 and 22497, 11, 60.3~127.0 mm, Sep. 9, 1976; MTUF 22493, 1, 108.3 mm, Mar. 5, 1977; MTUF 22771, 22772 and 22577, 3, 117.3~131.5 mm, May 29, 1977; MTUF 22498, 1, 128.5 mm, Jun. 18, 1974; MTUF 22517, 3, 129.0~141.5 mm, collecting date unknown; MTUF 22501, 1, 133.0 mm, Apr. 10, 1974; MTUF 22500, 1, 143.0 mm, May 26, 1976; MTUF 22495, 1, 166.0 mm, May 28, 1976; MTUF 22496, 1, 167.5 mm, Jan. 22, 1976; MTUF 22494, 1, 179.5 mm, Oct. 23, 1976;

MTUF 22537, 1, 183.2 mm, May 18, 1977. From Yokosuka, Kanagawa Pref.: MTUF 23062~23065 and 23080, 6, 73.0~207.5 mm, Aug. 12, 1977; YCM 3333, 1, 40.5 mm, May 3, 1974; YCM 3361, 2, 45.0~45.5 mm, May, 1974; YCM 556, 3, 110.5~187.5 mm, Mar. 23, 1974; YCM 609, 1, 50.2 mm, collecting date unknown; YCM 473, 1, 214.0 mm, collecting date unknown; YCM 3251-1 and 3288, 2, 172.0 and 188.5 mm, 1974. From Miura, Kanagawa Pref.: YCM 26, 2, 148.0 and 156.5 mm, 1952. From Izu-Oshima Is., Tokyo: MTUF 22503, 1, 76.0 mm, Aug. 4, 1974. From Arasato, Shizuoka Pref., MTUF

22502, 1, collecting date unknown.

### Description

Mean values are given in parentheses for proportional measurements, but not for meristic counts because of the occurrence of geographic variation in counts as shown later in this paper.

D. L~LIX, 7~13, 62~69 in total number; A. II, 40~45; P.<sub>1</sub> 10~13; P.<sub>2</sub> I (if present); C. 7+7; vertebrae 20~24+45~49=66~72. Measurements expressed in hundredths of standard length: body depth 10.6~15.9, (12.4); head length 14.8~23.8, (17.2); preanal length 39.1~51.3, (44.5); length of dorsal fin base 77.5~88.5, (84.1); length of anal fin base 47.4~58.1, (53.2). Measurements expressed in hundredths of head length: eye diameter 12.6~26.2, (18.3); upper jaw length 26.2~46.3, (38.2); interorbital width 7.4~16.7, (10.5); pectoral fin length 27.9~44.8, (35.4); length of last dorsal spine 21.9~34.1, (28.2). Pelvic fin present or absent. Pelvic girdle and dorsal spines thin. Third longitudinal lateral line on belly more or less well developed (Fig. 3b) or little developed (Fig. 3c).

Cephalic sensory canal system similar to that of *D. rubrimaculata* excepting that several

pores of infraorbital canal present on inner side posteriorly.

Scales cycloid. Body and base of unpaired fins covered with small scales. Head naked. Dorsal and anal fins connected with caudal fin by fin membranes at their bases. An olfactory tube anteroventrally to eye. Posterior tip of maxillary reaching posterior margin of eye. Branchial membranes meeting each other and free from isthmus. Adult male with a low medial dermal ridge in interorbital region.

Color in life: Body gray or brown, often with small black spots. Two large blotches on each side above pectoral fin. Margin of unpaired fins orange in some adult specimens. Juvenile and young with a broad white streak from tip of snout to origin of dorsal fin.

**Geographic variation.** As indicated in the foregoing description, pronounced variations are found in dorsal and anal fin-ray and vertebral counts in *D. burgeri*. Frequency distributions of these counts show a close association of the variations with geographic distribution (Table 1). In general, counts for dorsal spines and vertebrae are higher, and those for dorsal soft rays are lower, in specimens from the Tsugaru Strait, the Sea of Japan, including its adjacent area, and the

Table 1. Frequency distribution of selected meristic counts in *Dictyosoma burgeri*.

Form	Locality	Total vertebrae							Anal soft rays							Total dorsal rays									
		66	67	68	69	70	71	72	40	41	42	43	44	45	62	63	64	65	66	67	68	69			
Form a	Pacific and adjacent area																								
	Arasato		1							1							1								
	Izu-Oshima Is.		1							1							1								
	Miura		2							1 1							1 1								
	Yokosuka		8 5 3							6 8 1							1 4 10 1								
	Kominato		1 21 19 3							6 17 18 3							15 18 8 2								
Form b	Sea of Japan-East China Sea																								
	Nomozaki		4 18 17 2							10 21 14 1							2 13 17 7 2								
	Shimabara		1 1							1 1							2								
	Tsushima		2 7 9 3							8 11 2							5 8 8								
	Sado Is.		1 1 3							2 3							1 3 1								
	Hakodate		2 7 4							1 4 6							1 3 6 1								
	Pacific, northern Honshu																								
	Taneichi		1							1							1								

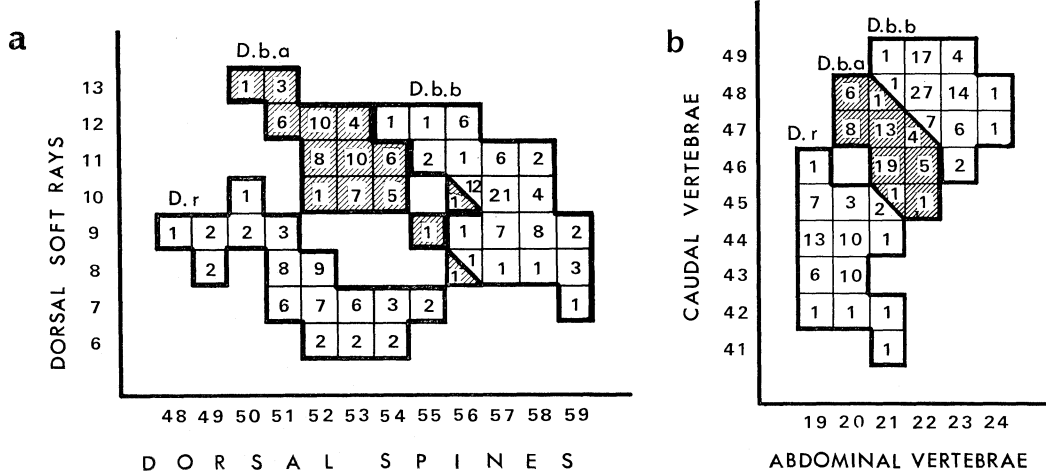


Fig. 7. Relationship a) between dorsal spines and soft rays and b) between abdominal and caudal vertebrae in *Dictyosoma*. D. r., *D. rubrimaculata*; D.b.a., *D. burgeri* form a; D.b.b., *D. burgeri* form b. Figures in each square indicates number of individuals.

Pacific coast of northern Honshu than in those from the Pacific coast of middle Honshu. In this paper the two assemblages are tentatively called form **b** and form **a**, respectively. The meristic separation of the two forms is clearly indicated in the relationship between dorsal spine and soft ray counts and between abdominal and caudal vertebral counts (Fig. 7).

The two forms of *D. burgeri* differ also in structural characters. In the form **a** the third longitudinal lateral line on the belly before the anus is more or less well developed and pelvic fins are present in young and tend to disappear with growth (Fig. 3 and Table 2). While in the form **b** the third lateral line is poorly developed on the abdomen before the anus, and pelvic fins are missing in all specimens except one in which vestigial spines were observed.

Incorporating all these morphological observations, it is obvious that *D. burgeri* in Japanese waters consists of two geographic variants. Outside Japan, *D. burgeri* has been recorded from Pusan on the Korean coast bordering the Korea Strait (Chyung, 1961) and Shanton in eastern China facing the Yellow Sea (Chang et al., 1955). It is certain from the descriptions and figures that the Chinese form belongs to the form **a** and the Korean form to the form **b**.

Table 2. Frequency by length-group of the presence of pelvic fins in *D. burgeri*. Frequency is indicated by number of individual(s). For the grouping of specimens, see text. \*, Vestigial spines present.

Standard length (mm)	Form a		Form b	
	Present	Absent	Present	Absent
10.0~ 39.9	9			1
40.0~ 69.9	13	4	1*	12
70.0~ 99.9	10	1		16
100.0~129.0	4	5		6
130.0~159.9	4	5		9
160.0~189.0		9		18
190.0~219.9		2		12
220.0~249.9				8
250.0~279.9				4

So far as on the basis of the material at hand, the two variants of *D. burgeri* are rather clearly delimited morphologically, and the variations as a whole appear to be of sufficient magnitude to warrant the recognition of two subspecies. However, we refrain from distinguishing them nomenclaturally until more ample materials become available from more extensive localities.

#### Morphological comparison

Dorsal and anal fin-ray and vertebral counts of *D. rubrimaculata* and *D. burgeri* are com-

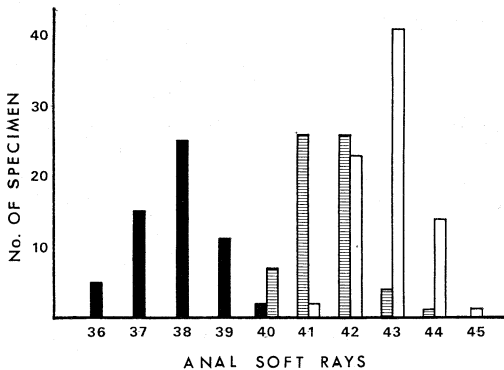


Fig. 8. Frequency distribution of anal soft ray counts in *D. rubrimaculata* (solid bars), *D. burgeri* form a (hatched bars), and *D. burgeri* form b (hollow bars).

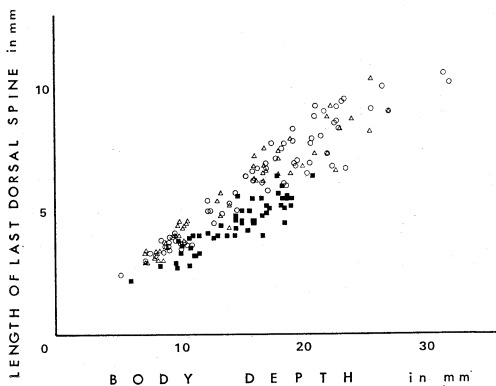


Fig. 9. Relationship between length of last dorsal spine and body depth in *Dictyosoma*. *D. rubrimaculata* (■), *D. burgeri* form a (△), and form b (○).

pared in Figs. 7 and 8. The length of the last dorsal spine in relation to body depth in the two species is compared in Fig. 9. The two species of *Dictyosoma* and the two geographic forms of *D. burgeri* are distinguished according to the following combinations of characters:

- 1a. Total vertebrae 61~66; total dorsal rays 57~62; anal soft rays 36~40; dorsal spines short, strong; pelvic fins present; dorsal and anal fins completely confluent with caudal fin; no dermal ridge on head; third lateral line on belly before anus completely developed; a red spot on side above pectoral fin. *D. rubrimaculata* sp. nov.

- 1b. Total vertebrae 66~72; total dorsal rays 62~69; anal soft rays 40~45; dorsal spines long, weak; pelvic fins present or absent; dorsal and anal fins incompletely united with caudal fin; a medial dermal ridge on head in male; third longitudinal lateral line on belly before anus partly or almost completely interrupted; not red spot above pectoral fin. .... 2
- 2a. Abdominal vertebrae 20~22, (mean 21.0), caudal vertebrae 45~48, (46.6), total number 66~69, (67.6); dorsal spines 50~56, (52.7), soft rays 8~13, (11.2), total number 62~66, (63.9); anal soft rays 40~44, (41.5); pelvic fins present in young, absent in adult; third longitudinal lateral line on belly more or less well developed. ....  
..... *D. burgeri* form a
- 2b. Abdominal vertebrae 21~24, (22.4), caudal vertebrae 46~49, (48.1), total number 69~72, (70.4); dorsal spines 54~59, (57.0), soft rays 7~12, (9.9), total number 64~69, (66.9); anal soft rays 41~45, (42.9); pelvic fins always absent; third longitudinal lateral line on belly little developed .....  
..... *D. burgeri* form b

### Ecological and evolutionary consideration

Based on the materials at hand and published records, *D. rubrimaculata* occurs on both sides of Japan, the form a of *D. burgeri* along the Pacific coast of Japan and in the Yellow Sea, and the form b on the coast of the Sea of Japan and adjacent waters. *D. rubrimaculata* is sympatric in its range with both forms of *D. burgeri*, and, so far as the available information shows, the two forms of *D. burgeri* are distributed allopatrically.

According to our underwater observations made at Kominato and Yokosuka, *D. rubrimaculata* and *D. burgeri* (form a) show isolation in their habitat preference. *D. rubrimaculata* inhabits mainly weedy and rocky infratidal zones such as the sargassum belt, and is usually found lurking among seaweeds or under rocks. While *D. burgeri* lives in shallower, poorly vegetated, sandy to rocky intertidal zones, where the fish was not found

among weeds.

The colors of the two species, especially the white broad streak on the head of young, seem to be of some camouflage function. The yellowish to brownish color of *D. rubrimaculata* resembles the colors of some seaweeds such as *Ecklonia*, *Eisenia* and *Sargassum*. The body color, along with the leaf-shaped tail, gives the fish the appearance of *Ecklonia*. The greyish to dark brownish color of *D. burgeri* matches the sandy or rocky background. Considering the similarity in coloration of the two forms in *D. burgeri*, it is possible that the habitat segregation of the same manner as found in the Pacific coast occurs in other areas where *D. rubrimaculata* and the form **b** of *D. burgeri* live together.

According to Makushok (1958), one of the trends of specialization in the Alectrininae and Xiphisterinae of the Stichaeidae is toward the intrusion to upper intertidal zones, and the intrusion accompanies the increase of vertebral numbers resulting in an elongation of the body and a reduction of the paired fins in relation to the increased need of creeping locomotion in shallower water. He also pointed out that the median dermal ridge of the head is a specialized character in stichaeids and their allies. With these views in mind, the morphological and ecological features of *D. rubrimaculata* can be considered to indicate a primitive condition of this species. *D. burgeri* may be a descendant from a *rubrimaculata*-like ancestral form.

#### Acknowledgments

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タウエガジ科の 1 新種ベニツケギンボ *Dictyosoma rubrimaculata*, 及びダイナンギンボ *D. burgeri* の地理的二型

谷津明彦・安田富士郎・多紀保彦

タウエガジ科の 1 新種ベニツケギンボ *Dictyosoma rubrimaculata* を記載した。本種は、従来、同属のダイナンギンボ *D. burgeri* と混同して扱われていたた

め、*D. burgeri* の再記載も行なった。両種は側線形態、不對鰭条数、体色等の相違により区別される。さらに、*D. burgeri* に地理的変異の 2 型が認められたが、より詳細な分布の検討が必要であると考えられたので、今回の報告では、本州中部太平洋岸から得られた form a と日本海及びその周辺水域から得られた form b とに暫定的に分けるにとどめた。

*D. rubrimaculata* と *D. burgeri* の 2 型は、それぞれ同所的に分布しており、千葉県小湊と神奈川県横須賀での水中観察の結果では、両者は棲み分けを行っていた。すなわち、*D. rubrimaculata* は所謂ガラモ場と呼ばれる潮下帯の一部に、一方 *D. burgeri* の form a は岩礁の潮間帯に主に見い出される。

*D. burgeri* における脊椎骨数の増加、腹鰭の退縮などの形態的特徴と上記の生活場所に関しての知見は、*D. burgeri* がより特化した種であることを示唆している。

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